

REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-8 are pending, together with non-examined claims 9-14 and 15-22 and new claims 23-24. In this regard, the prior oral election of claims 1-8 is acknowledged. In the event of cancellation of non-elected claims, Applicants reserve the right to file one or more division applications as provided by 35 USC 121.

Reconsideration of the rejections under 35 USC 112, second paragraph is respectfully requested for at least the following reasons.

Claim 1 is amended by deleting "optionally" with respect to the sintering step. The remaining grounds for indefiniteness are also obviated by the above amendments. The expressions, "-like" are deleted. The phrases, "such as" are deleted, and the deleted embodiments are made the subjects of new claims 23-24. The language of claim 4 is changed to provide antecedent basis. Claim 5 is amended although it is not agreed that the recitation of "predetermined" rendered the claim indefinite. Claim 8 is amended to include only a single reference to claim 1.

Accordingly, all of the rejections under 35 USC 112, second paragraph, are resolved and should be withdrawn.

Reconsideration of the rejection of claims 1-8, under 35 USC 102(a, b or e), as anticipated by, or alternatively, under 35 USC 103(a), as unpatentably obvious, over any one of Kamo et al (5,585,173), Köppler et al (5,979,186), Sayce et al (5,985,779), Loxley et al (6,012,304), Bhandarkar et al (6,209,357) or Loxley et al (6,355,587) is respectfully requested in view of the following comments.

Kamo et al relates to high-purity opaque quartz glass. The glass is characterized by content of closed cells, ratio of closed cells having sizes of 100  $\mu\text{m}$  or more to the whole of the cells. The opaque quartz glass is prepared from amorphous silica powder having an average particle size of 0.5 to 10  $\mu\text{m}$ , preferably 3 to 7  $\mu\text{m}$  (see, e.g., col. 2, lines 47-49).

Accordingly, the disclosure of Kamo et al would not anticipate the present claims which use pyrogenically produced silicon dioxide which, as described on page 10 of the specification, refers to nano-scale powders.

Köppler et al relates to manufacture of granular silica material which is characterized by being homogeneous, compact granular material with high purity and essentially consisting of spherical particles of uniform morphology (see col. 2, lines 3-6). The granular silica material may be sintered, however, there is no disclosure or suggestion that the granular mass

is subjected to a forming or compacting procedure such that a tamped density of from 150 g/l to 800 g/l in one embodiment or from 220 to 700 g/l in a second embodiment, will be obtained.

Accordingly, the disclosure of Köppler et al does not anticipate and would not have made *prima facie* obvious, the present invention.

Sayce et al related to opaque quartz glass of enhanced opacity and produced by fusion of silica particles. This reference does not anticipate or otherwise render obvious a sintered material, produced by a forming or compacting process and comprising pyrogenically produced silicon dioxide which has been compacted to granulates having a packed density of from 150 to 800 g/l, a granulate size of from 10 to 800  $\mu\text{m}$  and a BET surface area of from 10 to 500  $\text{m}^2/\text{g}$ ; or compacted pyrogenically produced silicon dioxide having the following physico-chemical properties:

mean particle diameter: from 25 to 120  $\mu\text{m}$ ,

BET surface area: from 40 to 400  $\text{m}^2/\text{g}$ ,

pore volume: from 0.5 to 2.5 ml/g,

pore distribution: no pores < 5 nm, only meso- and macro-pores are present,

pH value: from 3.6 to 8.5,

tamped density: from 220 to 700 g/l.

Accordingly, the subject matter of claims 1- 8 is not anticipated nor obvious in view of Sayce et al.

Loxley et al ('304) describes sintered quartz glass products and, more particularly, to the nitriding or nitridation of porous silica preforms (col. 7, lines 55-57) and involves the use of silica sols. There is no disclosure or suggestion of pyrogenically produced silicon dioxide having the properties as set forth in the pending claims under rejection.

Accordingly, the present inventions is neither anticipated by nor obvious in view of Loxley et al '304.

Bhandarkar et al describes a method for forming silica bodies useful for an optical fiber preform, using a sol-gel process. A precipitation process is employed in which silica precipitates at the contact sites of adjacent silica particles, thereby forming neck regions.

This reference does not disclose pyrogenically produced silicon dioxide which has been compacted to granules and, therefore, neither anticipates nor makes obvious the invention as disclosed and claimed herein.

Accordingly, withdrawal of the rejection based on Bhandarkar et al is respectfully requested.

Finally, Loxley et al ('587) is substantially the same as Loxley et al '304 and for the same reasons fails to anticipate and would not have made obvious, the subject matter of the present invention.

Favorable reconsideration and withdrawal of the rejections under Sections 102 and/or 103 is, therefore, respectfully requested.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Attached is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned "Version with markings to show changes made".

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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Enclosure: Appendix

APPENDIX  
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Amended) A sintered material, produced by means of a forming or compacting process, optionally a subsequent cleaning step and [optionally] a subsequent sintering process, comprising as a pre-sintering composition:

a) pyrogenically produced silicon dioxide which has been compacted to granulates having a tamped density of from 150 g/l to 800 g/l, a granulate particle size of from 10 to 800  $\mu\text{m}$  and a BET surface area of from 10 to 500  $\text{m}^2/\text{g}$ , or

b) pyrogenically produced silicon dioxide having the following physico-chemical data:

mean particle diameter: from 25 to 120  $\mu\text{m}$ ,

BET surface area: from 40 to 400  $\text{m}^2/\text{g}$ ,

pore volume: from 0.5 to 2.5 ml/g,

pore distribution: no pores < 5 nm, only meso- and macro-pores are present,

pH value: from 3.6 to 8.5,

tamped density: from 220 to 700 g/l.

2. (Amended) The sintered material according to claim 1, wherein the granulates are processed to the sintered material by means of a process comprising:

a1) preparing a dispersion of granulates having a solids content of from 10 wt.% to 85 wt.%, and a polar or non-polar inorganic or organic liquid,

a2) transferring the dispersion into a form or coating of surfaces with the dispersion,

a3) initiating gelling of the dispersion and drying of a gel-body or gel-body[-like] coating and drying the gel body or gel-body[-like] coating to form a green body or green-body[-like] coating;

a4) optionally cleaning the green body obtained after the drying operation, or the green-body[-like] coating, with gaseous substances, [such as chlorine or thionyl chloride,] at temperatures of from 700 to 1000°C and

a5) [optionally] sintering at a temperature of from 1000 to 1800°C, wherein a resulting sintered body or sintered surface is fully dense-sintered or is still partially porous.

3. (Amended) The sintered material according to claim 1, wherein the granulates are processed to the sintered material by means of a process comprising:

b1) introducing the granulates without aid of a liquid, into a form or application of the granulates to a surface, to provide a formed body or a layer,

b2) optionally, further compacting, wherein the formed body or the layer is pressed under a high external mechanical pressure at atmospheric pressure or at reduced pressure, wherein the formed body obtained after the pressing step, or the compacted coating, can optionally be cleaned with gaseous substances, [such as chlorine or thionyl chloride,] at temperatures of from 700 °C to 1000 °C and sintered by means of a sintering step at a temperature of from 1000 °C to 1800°C, wherein a resulting sintered body or sintered surface is fully dense-sintered or is still partially porous.

4. (Amended) The sintered material according to claim 1, wherein the granulates are processed to the sintered material by means of a process comprising:

applying the granulates to formed bodies or surfaces by thermal or other high energy processes, in which a solid formed body or a solid coating is obtained and sintered so that

[and] the resulting sintered body or sintered surface is fully dense-sintered or is still partially porous.

5. (Amended) [Sintered materials] A sintered material according to claim 1, wherein during production thereof, the granulates, by action of thermal, electric or electromagnetic energy, are brought into a [predetermined] form before or after heating and are then sintered so that a resulting sintered body or sintered surface is fully dense-sintered or is still partially porous, or the granulates are melted partially or completely, and formed before or after heating to solidify in a form or as a coating, and optionally after-treated.

8. (Amended) The sintered material according to claim 1, wherein the sintered material comprises a glass and properties of the glass sintered or melted from corresponding very fine powder particles correspond to properties of a glass having an identical chemical composition that has been produced via a conventional melting process without using [the] said compacted granulates [**according to claim 1**], wherein production of said sintered material requires substantially lower sintering temperatures as compared with the melting temperature required to produce the glass having an identical composition that has been produced via the conventional melting process.

End of Appendix